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indifferent. The body of the text is a mixture of plans which it is stated the enquiry will develop; of facts which are submitted in evidence in the study; and of inadequately supported statements drawn from every variety of source. The Memorandum as a whole is of a piece only in its extraordinary deficiencies—its careless composition, its superficial treatment of material, its unintelligent plan of procedure.

The events of the past year add a touch of irony to the entire issue. The crisis of underproduction has passed into a world-wide depression in which traders cannot dispose of goods on hand and manufacturers complain of accumulated stocks. An enquiry into production is needed as much as ever, but it should not be conducted along the lines nor in the spirit of the Labour Office's Introductory Memorandum. This ill-fated publication is an excellent example of what not to print. A fitting title would be: "Preliminary Office Notes—(Published by Mistake)."

EDMUND E. DAY

The Assessment of Physical Fitness. By Georges Dreyer, G.B.E., M.A., M.D. Cassell and Company, Limited: London, New York, Toronto, and Melbourne. 1920. 115 pp.

Dreyer commences his book with a statement that most of the existing tables dealing with the size of the normal human body are based on the theory that definite relations between age and height and weight exist. It has been satisfactorily proved that such relationships do not exist when individuals varying widely in size are examined. Dreyer's findings seem to indicate that definite relationships between weight of body and length of trunk (*i. e.*, the sitting height) and the circumference of the chest do exist, and that these have a definite relation to the vital capacity of the lungs.

He had previously determined these definite relations, not only between the weight and certain measurements of the body but also between these bodily measurements and the functional measurement of vital capacity, and presents his results with a hope that general application of these relationships might add greatly to our present knowledge regarding standards of health development, good physique, and physical fitness. After a careful examination of many thousand individuals, and an analysis of the results obtained, Dreyer is enabled to explain the relationship between weight and sitting height, weight and chest measurement, chest measurement and sitting height, vital capacity and weight, vital capacity and sitting height, and vital capacity and chest measurement, for both males and females, in the following formulae: *

$$\begin{array}{c} \text{MALES} \\ W = 0.38025 \lambda^{\frac{1}{0.319}}; \quad W = 0.662 Ch^{\frac{1}{0.365}}; \quad Ch = \frac{\lambda^{1.1442}}{2.00148}; \end{array}$$

* W = weight of the body in grammes; λ = length of the trunk in centimetres; Ch = circumference of the chest in centimetres; $V. C.$ = Vital Capacity in cubic centimetres. The constants for Vital Capacity represent Class A.

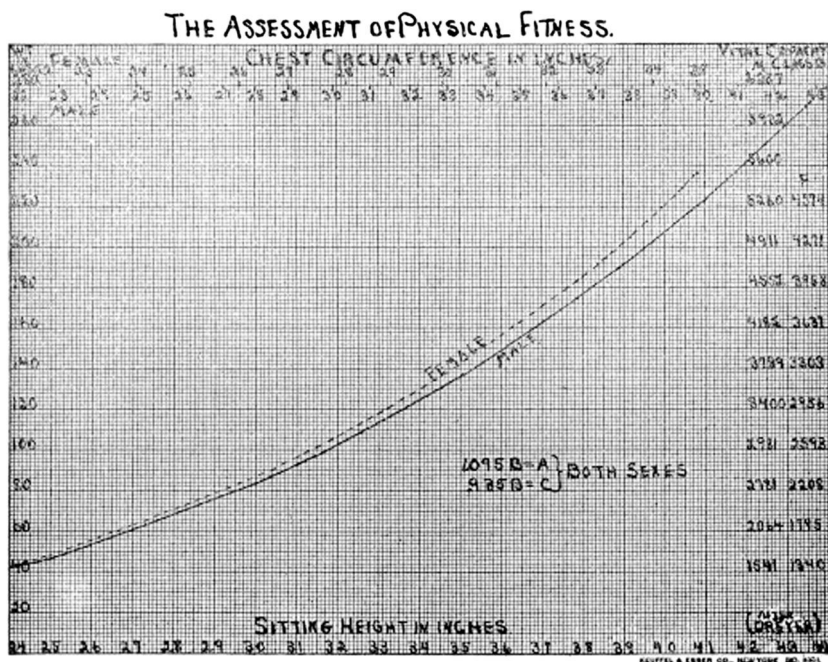
$$V. C. = \frac{W^{0.72}}{0.69}; \quad V. C. = \frac{\lambda^{2.257}}{6.1172}; \quad V. C. = \frac{Ch^{1.973}}{1.5595}.$$

FEMALES

$$W = 0.36093 \times 0.313 \sqrt{\lambda}; \quad W = 0.30213 \times 0.284 \sqrt{Ch.}; \quad Ch. = \frac{\lambda^{0.9074}}{0.761833};$$

$$V. C. = \frac{W^{0.72}}{0.79348}; \quad V. C. = \frac{\lambda^{2.3003}}{8.2714}; \quad V. C. = \frac{Ch^{2.5352}}{16.4951}.$$

The accompanying graph gives the substance of some ninety pages of tables which furnish information regarding the weight of the human body in its relationship to the sitting height, the chest circumference, and the vital capacity of the lungs. In this graph, English measures are used, except that vital capacity is expressed in cubic centimetres.



To make proper use of the graph, it is essential that all measurements should be taken uniformly, and as nearly as possible in the following manner:

WEIGHT. All weights should be taken as of the body without clothing.

LENGTH OF TRUNK. This should show the distance from the base of the spine to the top of the head. The subject's knees should be elevated sufficiently, the back should be straightened, and the eyes should look straight forward in such a manner that the exact length of vital stem may be obtained.

CIRCUMFERENCE OF CHEST. This should give as nearly as possible the measure taken by a tape in direct contact with the skin. In the males the tape should be held at the level of the fourth intercostal space in the nipple line. In the females this measure is taken at the same level, just under the breasts. At time of taking chest measurement there should be normal breathing.

VITAL CAPACITY. This is a measure of the maximum amount of air an individual is able to expel from the lung by voluntary effort, after taking the deepest possible inspiration. Record the best measure out of five trials. Dreyer finds the most suitable apparatus for this measurement to be made by Georges Boullite of Paris. It will be noted that there is a separate graph for males and for females. Such a division is essential because the two sexes differ in the particular measurements taken.

The tables are intended to be used for the following purposes:

1. The determination of what are the normal proportions between the weight, the trunk-length, and the circumference of the chest.
2. To gain evidence as to underfeeding or malnutrition during different stages of adolescent or adult life, as well as in various classes and occupations of the population.
3. For the study of the different aspects of physical fitness as measured by vital capacity in its relation to weight, trunk-length, and chest-circumference; for the comparison of adolescents with adults, and of the male sex with the female; for the comparison of different trades, occupations, and classes one with another, referring all to a definite common standard.
4. The application of these various measurements to patients with organic disease—*e. g.*, pulmonary tuberculosis—as well as to persons with functional disorders—*e. g.*, industrial fatigue, the fatigue of aviators, and so on.

To gain information concerning these various points, it is obvious that the tables must be used in the correct manner. To ensure this, a detailed description of their use, application, and limitations is now given.

To determine whether the weight of an individual is normal, it is necessary to take his sitting height and then to look up the weight corresponding to that height in the graph, or, in case Dreyer's work is available, in his tables. After taking the circumference of the chest, look up in the graph, or tables, the corresponding weight for that chest measurement. An average of these two weights should give within 5 per cent of the individual's true weight, providing he has a normal weight. For example, if the man's sitting height is 34 inches, he should weigh 125 pounds. If his chest circumference is 32½ inches he should weigh 127 pounds. The average of these two weights, 126 pounds, represents what he should weigh normally. A variation of

Less than 5 per cent indicates normal weight;

More than 5 per cent indicates possibly abnormal weight;

More than 10 per cent indicates probably abnormal weight;

More than 15 per cent indicates certainly abnormal weight in whatever direction the variation may be.

If the examinee has a normal weight in relation to his sitting height, but an abnormal weight in relation to his chest circumference, this condition indicates that his chest is either too large or too small in proportion to sitting height and weight.

For vital capacity, three readings are given under classes A, B, and C. The

readings for Class B only are given in the accompanying graph. Class A includes trained army and navy men, policemen, athletes and active sportsmen, university students and boys in public schools engaged in playing games, members of the fire brigade, blacksmiths and boiler makers. The vital capacity of this class can be computed by multiplying the Class B readings by 1.095.

Class B includes professional classes, business men, railway men, high grade mechanics, the better class of school children, and clerks of the upper class.

Class C includes tailors, shop keepers, shoemakers, printers, potters, lower class clerks, painters, elementary school children, and factory children. The expected vital capacity for this class can be found by multiplying the Class B readings by 0.935.

If a person is found to have as much as 10 per cent less vital capacity than that indicated in the graph or in Dreyer's tables, it is possible that he is suffering from some health-depressing condition. If his vital capacity is as much as 15 per cent below that indicated in the graph, it is practically certain that he is subnormal in this condition. The method of determining what the vital capacity of an individual should be is exactly the same as that for finding what his normal weight should be. Quoting from the author again:

"It is perhaps worth recording that changes in the vital capacity appear to offer an unusually trustworthy index of any improvement or deterioration taking place in the pulmonary lesions of patients with tuberculosis of the lungs. It also appears from the study of a tolerably large number of such cases that determinations of the vital capacity and its changes may be of value in prognosis, and help the physician to decide, for example, which patients are likely to benefit by further sanatorium treatment and which are not."

The author appears in this work to have supplied physical examiners with a method easily applied whereby physical fitness can be assessed on the basis of four very simple physical measurements, namely, that of sitting height, chest measurements, weight, and capacity of lungs.

FRANK M. PHILLIPS

George Washington University

Defects Found in Drafted Men. By A. G. Love and C. B. Davenport. Surgeon General's Office. New ed. Washington: Government Printing Office. 1920. 1559 pp.

The statistical reports of the results of examinations of American youths (ages 21 to 31) subject to the selective service, which were given out at the time of the examinations, were very instructive and enlightening. The present comprehensive volume deepens and strengthens the impression made by these reports, namely, that we had been negligent about cultivating and conserving the health and strength of our boys; it may also give more accurate statements, and it unquestionably adds materially to the information supplied. Much of this additional information is perhaps of little actual value, exhibiting slight chance variations between different sections of the country; but part of it is indeed illuminating.